One principal difference between the Type "B" probe and the previously described Type "A" probe is that a Type "B" energy delivery member is (i) substantially flexible in bending, or (ii) resilient in a radial direction relative to the axis **215** of the member. One purpose for flexible energy delivery members **220A-220B** is so that the members can fan out to surround the targeted tissue **tt** as they are advanced out of introducer **210** in a somewhat lateral direction relative to the longitudinal axis of the introducer **210**. The deployed energy delivery members **220A-220B** can have a variety of different deployed geometries including one or more radii of curvature. As shown in FIG. 8, the energy delivery members **220A-220B** in a deployed position have a curved portion that can define a volume of targeted tissue therebetween that is targeted for ablation. As can be easily understood, prior to deployment, the energy delivery members **220A** and **220B** of FIG. 8 can be constrained in a linear position in channels in the introducer **210**. Typically, the interior cores of the members **220A-220B** are of a spring-type material or shape-memory material that is tensioned when confined in a channel of the introducer **210**. The members **220A** and **220B** become sprung or expanded as the members are deployed and extended from the introducer **210**. Alternatively, the energy delivery members can be made of a shape memory metal (e.g., a nickel titanium alloy) as is known in the art to thereby provide an expanded shape outside of the introducer following a change in temperature caused by resistive heating thereof.

Of particular interest, the requirement of a flexible or resilient energy delivery member resulted in the development of an assembly of materials that provide a *flexible* or *resilient* surface engagement layer portion **240A**, a *flexible* or *resilient* medial conductive portion **240B** of a PTC-type material together with a core conductive portion (electrode) **240C** of a shape memory or spring-type material. FIG. 9 illustrates an exemplary section of such a flexible energy delivery member **220** that can bend to a straight position indicated in phantom view. The core conductive electrode **240C** again is coupled to electrical source **150A** and controller **150B**, as described previously.

The energy delivery member **220** of FIG. 9 has a core conductor **240C** that can be oval and is of a shape memory material of any suitable dimension indicated at $\mathbf{d_3}$. Of particular interest, the medial conductive portion **240B** comprises a silicone material that can function as a PTC-type resistive matrix that functions as described above. More in particular, one embodiment of the medial conductive portion **240B** can be fabricated from a medical grade silicone. The silicone material of the medial conductive portion **240B** was doped with a selected volume of conductive particles, e.g.,

carbon or graphite particles. By weight, the ration of silicone-to-carbon can range from about 10/90 to about 70/30 (silicone/carbon) to provide various selected switching ranges wherein the inventive composition functions as a PTC material exactly as described previously. More preferably, the carbon percentage in the matrix is from about 40-80% wit the balance silicone. As described previously, carbon types having single molecular bond are preferred. One preferred composition has been developed to provide a switching range of about 75° C. to 80° C. with the matrix having about 50-60 percent carbon with the balance of silicone. The medial conductive portion **240B** can have any suitable thickness dimension indicated at $\mathbf{d_2}$, ranging from about 0.001" to 0.02" depending on the cross-section of member **220A**, and it should be appreciated that such thickness dimension $\mathbf{d_2}$ will increase substantially as its temperature increases which is a significant factor in its increase in resistance to current flow across the element (see FIG. 6). The embodiment of FIG. 9 further shows a substantially flexible surface engagement layer portion **240A**. Such a thin flexible and/or stretchable coating can comprise any suitable thin-film deposition, such as gold, platinum, silver, palladium, tin, titanium, tantalum, copper or combinations or alloys of such metals, or varied layers of such materials. A preferred manner of depositing a metallic coating on the polymer element comprises an electroless plating process known in the art, such as provided by Micro Plating, Inc., 8110 Hawthorne Dr., Erie, PA 16509-4654. The thickness $\mathbf{d_1}$ of the metallic coating ranges between about .0001" to .005". Other similar electroplating or sputtering processes known in the art can be used to create a thin film coating. As another alternative, spaced apart strips of a thin metallic foil can be bonded to the flexible substrate layer portion **240B** which thereby would comprise the engagement plane **240A**.

In the probe of FIG. 8 & 10A, it can be seen that the engagement planes **225A-225B** are provided in a longitudinal arrangement on only one face of each member. The outwardly-facing portion of each member **220A-220B** is covered with an insulator layer indicated at **244**. The insulator layer **244** can be of any suitable material such as nylon, polyimide or many other thermoplastics. Such an insulator layer **244** is optional and is shown in phantom view in the sectional view of FIG. 9.

In operation, referring to FIGS. 8 and 10A, it can be seen that the energy delivery members **220A-220B** can fan out to surround the targeted tissue **tt** as they are advanced out of the introducer in a somewhat lateral direction relative to the introducer axis. Assume that the therapy again involves the ablation of a benign or malignant tumor, including

margins **m** around the exterior surface of the tumor. It can be easily understood that the plurality of engagement planes **225A-225B** on opposing sides of the targeted tissue **tt** can help to confine the Rf energy density in the region circumscribed by the plurality of energy delivery members **220A-220B**. The insulator layer **244** further prevents the active Rf heating of tissue outwardly from the members. In all other respects, the deployed energy delivery members **220A-220B** function as described above to modulate energy application to the targeted tissue **tt** based on the selected switching range of the medial thermally-sensitive material **240B**.

FIG. 10B illustrates another embodiment of the energy delivery member **220A** of FIG. 8. In this embodiment, the distal termination of member **220A** carries an Rf cutting electrode **265** that is independently coupled to a high voltage Rf source. It can be understood that an insulated electrical lead **266** can run through the length of energy delivery member **220A**. When the member **220A** is piercing into tissue, the activation of such a high voltage electrode **265** as is known in the art can cause the tip to cut into tissue to thereby allow the shape memory member **220** to not deflect from its desired path. FIG. 10B illustrates another optional feature of an energy delivery member that comprises a saline inflow mechanism that comprises a remote saline source **268** and at least one inflow port **269** proximate to, or within, the engagement plane **225**. In some thermally-mediated therapies, either the time duration of the therapy or the targeted temperature can cause unwanted dehydration that will reduce the application of energy to tissue, both active Rf heating and conductive heating as described above. An inflow of saline solution from source **268**, either controlled by a pressure source coupled to controller **150B** or a gravity system can maintain conductive fluid about the engagement plane of the working end. The size and number of fluid inflow ports **269** can vary, depending on the dimensions and shape of the engagement plane **225**.

As described above, the scope of the invention includes an energy delivery member **220A** with a medial conductive layer **240B** that is resilient, compressible or radially flexible. FIGS. 11A-11B illustrate an energy delivery member **220A** that can comprise an alternative embodiment of the type of probe **200** described in FIGS. 8-10A. FIG. 11A illustrates a cut-away view of introducer **210** that slidably carries a round energy delivery member **220A** that again has a core conductor **240C** having any suitable cross-sectional dimension $\mathbf{d_3}$. The medial conductive portion **240B** comprises a silicone material that functions as a PTC-type resistive matrix and also is somewhat compressible or spongy.